Volunteer Lake Assessment Program Individual Lake Reports
LOCKE LAKE, BARNSTEAD, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	2,039	Max. Depth (m):	2	Flushing Rate (yr¹)	9.9		
Surface Area (Ac.):	149	Mean Depth (m):	0.8	P Retention Coef:	0.59		
Shore Length (m):	8,140	Volume (m³):	466,700	Elevation (ft):	639		

TROPHIC CLASSIFICATION

Year	Trophic class
2010	MESOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.
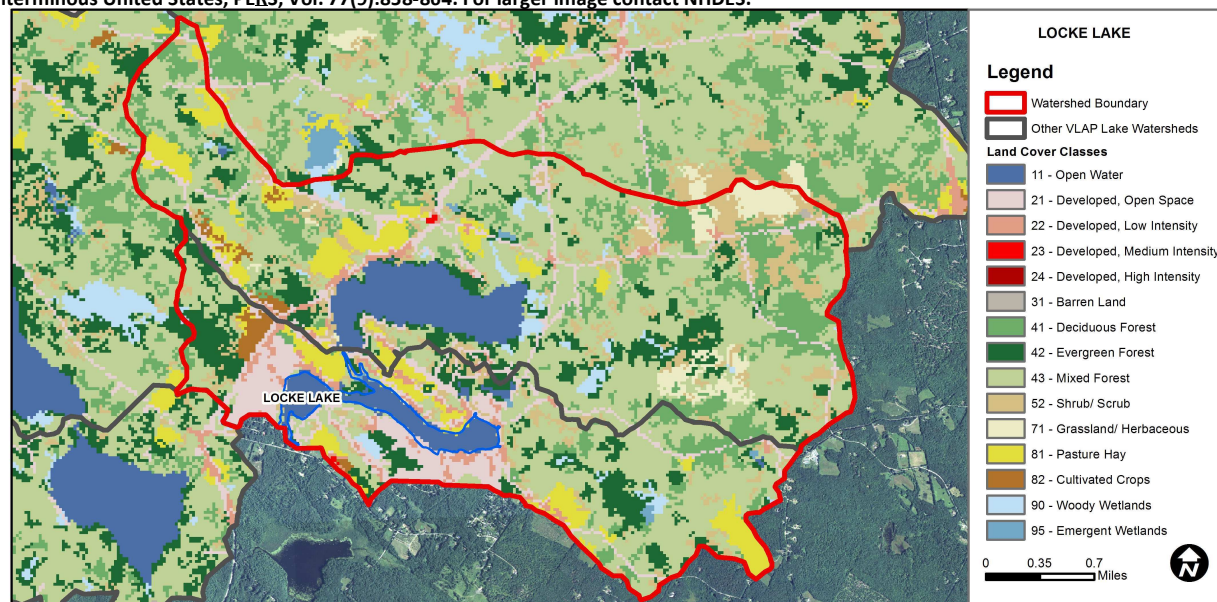
Designated Use	Parameter	Category	Comments
Aquatic Life	pH	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	D.O. (mg/L)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	D.O. (% sat)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	Chlorophyll-a	Cautionary	<5 samples and median is < threshold. More data needed.
Primary Contact Recreation	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.
	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Very Good	At least 10 samples with 0 exceedances of criteria.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

LOCKE LAKE - WINCHESTER DRIVE BEACH	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.
LOCKE LAKE - VARNEY BEACH	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
LOCKE LAKE - COLONY BEACH	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
LOCKE LAKE - POINT BEACH	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
LOCKE LAKE -N SHORE RD BEACH	E. coli	Encouraging	>2 samples exist that are > 75% of geometric mean criteria, but not enough samples to calculate geometric mean. No single sample exceedances. More data needed.
LOCKE LAKE - NORTH BARNSTEAD ROAD BEACH	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
LOCKE LAKE - GEORGETOWN BEACH #6	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.

Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	7.34	Barren Land	0.03	Grassland/Herbaceous	2.31
Developed-Open Space	9.43	Deciduous Forest	11.87	Pasture Hay	6.93
Developed-Low Intensity	2.16	Evergreen Forest	11.7	Cultivated Crops	0.96
Developed-Medium Intensity	0.06	Mixed Forest	37.54	Woody Wetlands	1.82
Developed-High Intensity	0	Shrub-Scrub	7.54	Emergent Wetlands	0.3

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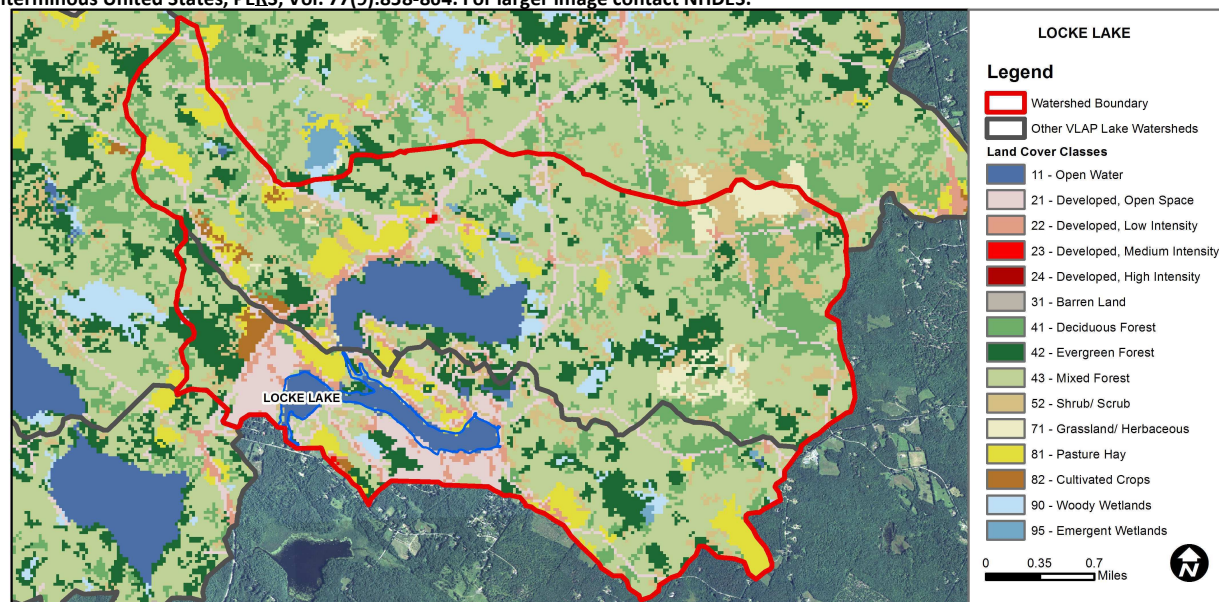
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	Chlorophyll-a	No Data	No Data for this parameter.
Primary Contact Recreation	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.
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**OBSERVATIONS AND RECOMMENDATIONS** (*Refer to Table 1 and Historical Deep Spot Data Graphic*)

🔹 **CHLOROPHYLL-A:** Chlorophyll levels were slightly elevated and are greater than the NH lake median.

🔹 **CONDUCTIVITY/CHLORIDE:** Conductivity and chloride levels were slightly greater than the NH lake median.

🔹 **TOTAL PHOSPHORUS:** Epilimnetic phosphorus levels were elevated and have remained above 20 ug/L since 2009.

🔹 **TRANSPARENCY:** Transparency was good and the Secchi disk was visible on the lake bottom.

🔹 **TURBIDITY:** Deep spot turbidity levels were slightly elevated possibly due to the increased algal growth.

🔹 **pH:** pH levels have been generally lower than desirable.

🔹 **RECOMMENDED ACTIONS:** Increase monitoring frequency to three times per summer to better assess summer water quality and historical trends. Consider implementing a reduced salt zone along the paved road sections of the lake to help reduce chloride and conductivity levels. Educate watershed residents on ways to reduce stormwater runoff from their properties utilizing DES' "NH Homeowner's Guide to Stormwater Management".

Dissolved Oxygen & Temperature Profile

Locke Lake Phytoplankton Population

- Greens — 4%
- Cyanobacteria — 73%
- Golden-Brown — 18%
- Diatoms — 5%
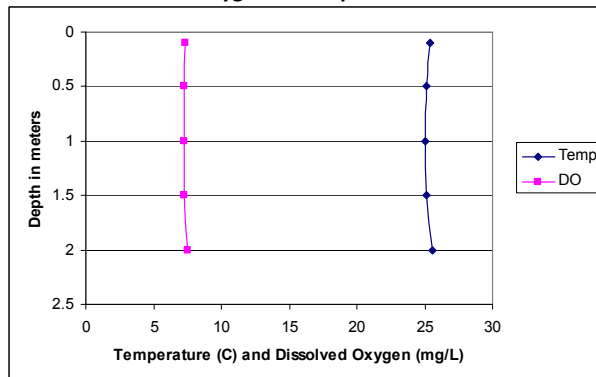
Station Name	Table 1. 2012 Average Water Quality Data for LOCKE LAKE								
	Alk.	Chlor-a	Chloride	Cond.	Total P	Trans.		Turb.	pH
	mg/l	ug/l	mg/l	uS/cm	ug/l	m		ntu	
						NVS	VS		
Deep Epilimnion	3.40	7.98	12	67.0	22	2.05	2.20	2.33	6.51
Munroe Inlet			8	51.5	18			0.98	6.47
Outlet				70.0	17			1.49	6.62
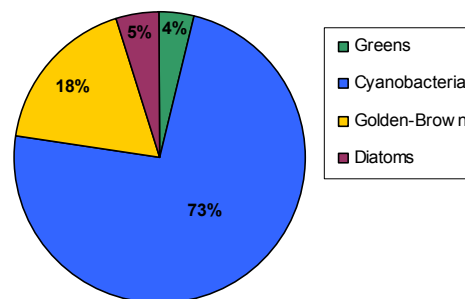
NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: < 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: 6.5-8.0 (unless naturally occurring)

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation
Chlorophyll-a	N/A	More data necessary to establish trends.
Transparency	N/A	More data necessary to establish trends.
Phosphorus (epilimnion)	N/A	More data necessary to establish trends.

This report was generated by the NH DES Volunteer Lake Assessment Program (VLAP). For more information contact:
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sara.steiner@des.nh.gov

Historical Deep Spot
Chlorophyll-a, Epilimnetic Total Phosphorus & Transparency Data